

## RU 2313176

WPI Acc no: 1999-010190/199901

Related WPI Acc No: 1998-033010; 1998-042509; 1999-106398

XRPX Acc No: N1999-007470

**Subscriber unit for multiple speed channel communications - has number of input sources mapped and Walsh code converted before being spread coded and quadrature modulated for output**

Patent Assignee: ODENWALDER J P (ODEN-I); QUALCOMM INC (QUAL-N)

Inventor: ODENWALDER J P; ODENWALDER J

Patent Family ( 36 patents, 81 countries )

Patent Number	Kind	Date	Application Number	Kind	Date	Update	Type
WO 1998052365	A2	19981119	WO 1998US9868	A	19980513	199901	B
AU 199874878	A	19981208	AU 199874878	A	19980513	199916	E
NO 199905530	A	19991112	WO 1998US9868	A	19980513	200009	E
			NO 19995530	A	19991112		
EP 981914	A2	20000301	EP 1998922295	A	19980513	200016	E
			WO 1998US9868	A	19980513		
FI 199902248	A	20000114	WO 1998US9868	A	19980513	200017	E
			FI 19992248	A	19991018		
CZ 199903990	A3	20000614	WO 1998US9868	A	19980513	200037	E
			CZ 19993990	A	19980513		
BR 199809814	A	20000627	BR 19989814	A	19980513	200039	E
			WO 1998US9868	A	19980513		
CN 1256813	A	20000614	CN 1998805015	A	19980513	200048	E
NZ 500443	A	20010223	NZ 500443	A	19980513	200115	E
			WO 1998US9869	A	19980513		
MX 199910403	A1	20000601	MX 199910403	A	19991112	200133	E
US 20010007572	A1	20010712	US 1996660438	A	19960607	200143	E
			US 1997856428	A	19970514		
			US 2001785925	A	20010215		
KR 2001012602	A	20010215	KR 1999710561	A	19991115	200154	E
US 20010055329	A1	20011227	US 1996660438	A	19960607	200206	E
			US 1997856428	A	19970514		
			US 2001804652	A	20010312		
JP 2002508896	W	20020319	JP 1998549548	A	19980513	200222	E
			WO 1998US9868	A	19980513		
AU 746537	B	20020502	AU 199874878	A	19980513	200238	E
US 6621875	B2	20030916	US 1996654443	A	19960528	200362	E
			US 1996660438	A	19960607		
			US 1997856428	A	19970514		
			US 2001804652	A	20010312		
US 6678311	B2	20040113	US 1996654443	A	19960528	200405	E
			US 1996660438	A	19960607		
			US 1997856428	A	19970514		
			US 2001785925	A	20010215		
IL 132456	A	20040328	IL 132456	A	19980513	200429	E

CA 2463381	A1	19981119	CA 2289231	A	19980513	200442	E
			CA 2463381	A	19980513		
US 20040190600	A1	20040930	US 1996654443	A	19960528	200465	E
			US 1996660438	A	19960607		
			US 1997856428	A	19970514		
			US 2001785925	A	20010215		
			US 2004756868	A	20040113		
RU 2242086	C2	20041210	WO 1998US9868	A	19980513	200508	E
			RU 1999126418	A	19980513		
KR 455822	B	20041106	WO 1998US9868	A	19980513	200517	E
			KR 1999710561	A	19991115		
EP 1596519	A2	20051116	EP 1998922295	A	19980513	200575	E
			EP 200518037	A	19980513		
FI 200500979	A	20050930	US 2000505239	A	20000216	200579	E
			FI 2005979	A	20050930		
CN 1728575	A	20060201	CN 1998805015	A	19980513	200639	E
			CN 200510097613	A	19980513		
MX 239698	B	20060823	WO 1998US9868	A	19980513	200702	E
			MX 199910403	A	19991112		
CN 1279702	C	20061011	CN 1998805015	A	19980513	200716	E
NO 200700315	A	19991112	NO 19995530	A	19991112	200724	NCE
			NO 2007315	A	20070117		
CA 2289231	C	20070710	CA 2289231	A	19980513	200747	E
			WO 1998US9868	A	19980513		
EP 981914	B1	20070725	EP 1998922295	A	19980513	200751	E
			WO 1998US9868	A	19980513		
			EP 200518037	A	20050819		
DE 69838133	E	20070906	DE 69838133	A	19980513	200761	E
			EP 1998922295	A	19980513		
			WO 1998US9868	A	19980513		
NO 324198	B1	20070910	WO 1998US9868	A	19980513	200763	E
			NO 19995530	A	19991112		
DE 69838133	T2	20071031	DE 69838133	A	19980513	200774	E
			EP 1998922295	A	19980513		
			WO 1998US9868	A	19980513		
ES 2286851	T3	20071201	EP 1998922295	A	19980513	200782	E
RU 2313176	C2	20071220	RU 1999641813	A	19980513	200802	E
			RU 2001123498	A	19980513		
CZ 298696	B6	20071227	WO 1998US9868	A	19980513	200804	E
			CZ 19993990	A	19980513		

Priority Applications (no., kind, date): US 1996654443 A 19960528; US 1996660438 A 19960607; US 1997856428 A 19970514; WO 1998US9868 A 19980513; US 2001785925 A 20010215; US 2001804652 A 20010312; US 2004756868 A 20040113; NO 2007315 A 20070117

#### Patent Details

Patent Number	Kind	Lan	Pgs	Draw	Filing Notes
WO 1998052365	A2	EN	46	14	
National Designated States,Original					AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE GH GM GW HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG UZ VN YU ZW
Regional Designated States,Original					AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SZ UG ZW
AU 199874878	A	EN			Based on OPI patent
NO 199905530	A	NO			PCT Application
EP 981914	A2	EN			PCT Application
					Based on OPI patent
Regional Designated States,Original					AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
FI 199902248	A	FI			PCT Application
CZ 199903990	A3	CS			PCT Application
					Based on OPI patent
BR 199809814	A	PT			PCT Application
					Based on OPI patent
NZ 500443	A	EN			PCT Application
					Based on OPI patent
US 20010007572	A1	EN			C-I-P of application
					Division of application
					C-I-P of patent
US 20010055329	A1	EN			C-I-P of application
					Division of application
					C-I-P of patent
JP 2002508896	W	JA	53		PCT Application
					Based on OPI patent
AU 746537	B	EN			Previously issued patent
					Based on OPI patent
US 6621875	B2	EN			C-I-P of application
					C-I-P of application
					Division of application
					C-I-P of patent
					C-I-P of patent
US 6678311	B2	EN			C-I-P of application
					C-I-P of application
					Division of application
					C-I-P of patent
					C-I-P of patent
IL 132456	A	EN			Based on OPI patent
CA 2463381	A1	EN			Division of application
US 20040190600	A1	EN			C-I-P of application
					C-I-P of application

				Division of application	US 1997856428
				Continuation of application	US 2001785925
				C-I-P of patent	US 5926500
				C-I-P of patent	US 5930230
				Continuation of patent	US 6678311
RU 2242086	C2	RU		PCT Application	WO 1998US9868
				Based on OPI patent	WO 1998052365
KR 455822	B	KO		PCT Application	WO 1998US9868
				Previously issued patent	KR 2001012602
				Based on OPI patent	WO 1998052365
EP 1596519	A2	EN		Division of application	EP 1998922295
				Division of patent	EP 981914
Regional Designated States, Original	AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI				
FI 200500979	A	FI		Division of application	US 2000505239
CN 1728575	A	ZH		Division of application	CN 1998805015
MX 239698	B	ES		PCT Application	WO 1998US9868
				Based on OPI patent	WO 1998052365
NO 200700315	A	NO		Division of application	NO 19995530
CA 2289231	C	EN		PCT Application	WO 1998US9868
				Based on OPI patent	WO 1998052365
EP 981914	B1	EN		PCT Application	WO 1998US9868
				Related to application	EP 200518037
				Related to patent	EP 1596519
				Based on OPI patent	WO 1998052365
Regional Designated States, Original	AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI				
DE 69838133	E	DE		Application	EP 1998922295
				PCT Application	WO 1998US9868
				Based on OPI patent	EP 981914
				Based on OPI patent	WO 1998052365
NO 324198	B1	NO		PCT Application	WO 1998US9868
				Previously issued patent	NO 9905530
DE 69838133	T2	DE		Application	EP 1998922295
				PCT Application	WO 1998US9868
				Based on OPI patent	EP 981914
				Based on OPI patent	WO 1998052365
ES 2286851	T3	ES		Application	EP 1998922295
				Based on OPI patent	EP 981914
RU 2313176	C2	RU		Division of application	RU 1999641813
CZ 298696	B6	CS		PCT Application	WO 1998US9868
				Previously issued patent	CZ 9903990
				Based on OPI patent	WO 1998052365

### Alerting Abstract WO A2

The cellular communications system provides subscriber communications using a number of information sources per subscriber, e.g. voice, video. A pilot signal (402), control channel (415) and two information channels are combined into one transmission. The first information channel (404) is mapped (405) and subjected to four symbol Walsh coding (Wf). The second information channel is also mapped (412) and Walsh coded using a two symbol code (Ws). An eight symbol Walsh code is used on the control data.

The sources are amplified, spread coded and quadrature modulated with the pilot signal for transmission.  
**ADVANTAGE** - Using Walsh codes of different lengths gives different data rates of high capacity and efficiency.

**Title Terms** /Index Terms/Additional Words: SUBSCRIBER; UNIT; MULTIPLE; SPEED; CHANNEL; COMMUNICATE; NUMBER; INPUT; SOURCE; MAP; WALSH; CODE; CONVERT; SPREAD; QUADRATURE; MODULATE; OUTPUT

### Class Codes

International Patent Classification

IPC	Class Level	Scope	Position	Status	Version Date
H04B-007/26; H04Q-007/00			Main		"Version 7"
H04J-013/04; H04L-001/00			Secondary		"Version 7"
H03M-0013/27	A	I	F	B	20060101
H04B-0001/04	A	I		R	20060101
H04B-0001/707	A	I	F	B	20060101
H04B-0001/707	A	I	L	R	20060101
H04B-0001/707	A	I	F	R	20060101
H04B-0001/707	A	I		R	20060101
H04B-0001/707	A	I	F		20060101
H04B-0007/005	A	I	L	R	20060101
H04B-0007/005	A	I		R	20060101
H04B-0007/26	A	I		R	20060101
H04B-0007/26	A	I	L	R	20060101
H04J-0013/04	A	I	L	R	20060101
H04L-0001/00	A	N		R	20060101
H04L-0001/00	A	I	L	R	20060101
H04L-0001/00	A	I		R	20060101
H04L-0001/00	A	I	L	B	20060101
H04L-0001/08	A	I		R	20060101
H04Q-0007/00	A	I		R	20060101
H04Q-0007/00	A	I	F		20060101
H04Q-0007/00	A	I	F	B	20060101
H04Q-0007/32	A	I		R	20060101
H03M-0013/00	C	I	F	B	20060101
H03M-0013/00	C	I		B	20060101
H04B-0001/04	C	I		R	20060101
H04B-0001/707	C	I	L	B	20060101
H04B-0001/707	C	I	F	B	20060101
H04B-0001/707	C	I	L	R	20060101
H04B-0001/707	C	I	F	R	20060101
H04B-0001/707	C	I		R	20060101

H04B-0001/707	C	I			20060101
H04B-0007/005	C	I	L	R	20060101
H04B-0007/005	C	I		R	20060101
H04B-0007/26	C	I		R	20060101
H04B-0007/26	C	I	L	R	20060101
H04J-0013/02	C	I	L	R	20060101
H04L-0001/00	C	N		R	20060101
H04L-0001/00	C	I	L	R	20060101
H04L-0001/00	C	I		R	20060101
H04L-0001/00	C	I		B	20060101
H04L-0001/08	C	I		R	20060101
H04Q-0007/00	C	I		R	20060101
H04Q-0007/00	C	I			20060101
H04Q-0007/00	C	I	F	B	20060101
H04Q-0007/32	C	I		R	20060101

US Classification, Issued: 375149000, 375148000, 375279000, 375130000, 375147000, 375146000, 370208000, 375295000, 370342000, 375147000

File Segment: EPI;

DWPI Class: W01; W02

Manual Codes (EPI/S-X): W01-B05A1A; W01-C01D3; W02-C03C1B; W02-C03C1C; W02-K05A1; W02-K05A7; W02-K05B3

## Original Publication Data by Authority

### Australia

**Publication No.** AU 746537 B (Update 200238 E)

Publication Date: 20020502

Assignee: QUALCOMM INC; US (QUAL-N)

Language: EN

Application: AU 199874878 A 19980513 (Local application)

Priority: US 1997856428 A 19970514

Related Publication: AU 9874878 A (Previously issued patent)

WO 1998052365 A (Based on OPI patent )

Original IPC: H04Q-7/00(A)

Current IPC: H04B-1/707(R,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C) H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-7/26(R,I,M,JP,20060101,20051220,A,L) H04B-7/26(R,I,M,JP,20060101,20051220,C,L) H04J-13/02(R,I,M,JP,20060101,20051220,C,L) H04J-13/04(R,I,M,JP,20060101,20051220,A,L) H04L-1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

**Publication No.** AU 199874878 A (Update 199916 E)

Publication Date: 19981208

Language: EN

Application: AU 199874878 A 19980513 (Local application)

Priority: US 1997856428 A 19970514

Related Publication: WO 1998052365 A (Based on OPI patent )

Original IPC: H04Q-7/00(A)  
Current IPC: H04B-1/707(R,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C)  
H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-  
7/26(R,I,M,JP,20060101,20051220,A,L) H04B-7/26(R,I,M,JP,20060101,20051220,C,L) H04J-  
13/02(R,I,M,JP,20060101,20051220,C,L) H04J-13/04(R,I,M,JP,20060101,20051220,A,L) H04L-  
1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

## Brazil

**Publication No.** BR 199809814 A (Update 200039 E)

Publication Date: 20000627

Language: PT

Application: BR 19989814 A 19980513 (Local application)

WO 1998US9868 A 19980513 (PCT Application)

Priority: US 1997856428 A 19970514

Related Publication: WO 1998052365 A (Based on OPI patent )

Original IPC: H04Q-7/00(A)

Current IPC: H04B-1/707(R,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C)  
H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-  
7/26(R,I,M,JP,20060101,20051220,A,L) H04B-7/26(R,I,M,JP,20060101,20051220,C,L) H04J-  
13/02(R,I,M,JP,20060101,20051220,C,L) H04J-13/04(R,I,M,JP,20060101,20051220,A,L) H04L-  
1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

## Canada

**Publication No.** CA 2289231 C (Update 200747 E)

Publication Date: 20070710

Language: EN

Application: CA 2289231 A 19980513 (Local application)

WO 1998US9868 A 19980513 (PCT Application)

Priority: US 1997856428 A 19970514

Related Publication: WO 1998052365 A (Based on OPI patent )

Original IPC: H04B-1/707(I,CA,20060101,A,L) H04B-1/707(I,M,98,20060101,C) H04B-  
7/005(I,CA,20060101,A,L) H04B-7/005(I,M,98,20060101,C) H04L-1/00(I,CA,20060101,A,L) H04L-  
1/00(I,M,98,20060101,C) H04Q-7/00(I,CA,20060101,A,F) H04Q-7/00(I,M,98,20060101,C)

Current IPC: H03M-13/00(B,I,M,RU,20060101,20041210,C,F) H03M-  
13/27(B,I,M,RU,20060101,20041210,A,F) H04B-1/707(R,I,M,EP,20060101,20051008,A,L) H04B-  
1/707(R,I,M,EP,20060101,20051008,C,L) H04B-7/005(R,I,M,EP,20060101,20051008,A,L) H04B-  
7/005(R,I,M,EP,20060101,20051008,C,L) H04B-7/26(R,I,M,JP,20060101,20051220,A,L) H04B-  
7/26(R,I,M,JP,20060101,20051220,C,L) H04J-13/02(R,I,M,JP,20060101,20051220,C,L) H04J-  
13/04(R,I,M,JP,20060101,20051220,A,L) H04L-1/00(R,I,M,EP,20060101,20051008,A,L) H04L-  
1/00(R,I,M,EP,20060101,20051008,C,L) H04Q-7/00(B,I,H,CA,20060101,19991224,A,F) H04Q-  
7/00(B,I,H,CA,20060101,19991224,C,F)

**Publication No.** CA 2463381 A1 (Update 200442 E)

Publication Date: 19981119

Language: EN

Application: CA 2289231 A 19980513 (Division of application)

CA 2463381 A 19980513 (Local application)

Priority: US 1997856428 A 19970514

Original IPC: H04B-1/04(A) H04Q-7/32(B)

Current IPC: H04B-1/04(R,A,I,M,EP,20060101,20051206,A) H04B-1/04(R,I,M,EP,20060101,20051206,C)

H04Q-7/32(R,I,M,EP,20060101,20051206,A) H04Q-7/32(R,I,M,EP,20060101,20051206,C)

## China

**Publication No.** CN 1256813 A (Update 200048 E)

Publication Date: 20000614

Assignee: QUALCOMM INC; US (QUAL-N)

Language: ZH

Application: CN 1998805015 A 19980513 (Local application)

Priority: US 1997856428 A 19970514

Original IPC: H04B-1/707(A) H04L-1/00(B)

Current IPC: H04B-1/707(R,A,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C)

H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-

7/26(R,I,M,JP,20060101,20051220,A,L) H04B-7/26(R,I,M,JP,20060101,20051220,C,L) H04J-

13/02(R,I,M,JP,20060101,20051220,C,L) H04J-13/04(R,I,M,JP,20060101,20051220,A,L) H04L-

1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

**Publication No.** CN 1279702 C (Update 200716 E)

Publication Date: 20061011

Assignee: QUALCOMM INC; US (QUAL-N)

Inventor: ODENWALDER J P

Language: ZH

Application: CN 1998805015 A 19980513 (Local application)

Priority: US 1997856428 A 19970514

Original IPC: H04B-1/707(I,CN,20060101,A,F) H04B-1/707(I,M,98,20060101,C,F) H04L-

1/00(I,CN,20060101,A,L) H04L-1/00(I,M,98,20060101,C,L)

Current IPC: H04B-1/707(B,A,I,H,CN,20060101,20061011,A,F) H04B-

1/707(B,I,H,CN,20060101,20061011,C,F) H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-

7/005(R,I,M,EP,20060101,20051008,C) H04B-7/26(R,I,M,JP,20060101,20051220,A,L) H04B-

7/26(R,I,M,JP,20060101,20051220,C,L) H04J-13/02(R,I,M,JP,20060101,20051220,C,L) H04J-

13/04(R,I,M,JP,20060101,20051220,A,L) H04L-1/00(R,I,M,EP,20060101,20051008,A) H04L-

1/00(R,I,M,EP,20060101,20051008,C)

**Publication No.** CN 1728575 A (Update 200639 E)

Publication Date: 20060201

Assignee: QUALCOMM INC; US (QUAL-N)

Inventor: ODENWALDER J P

Language: ZH

Application: CN 200510097613 A 19980513 (Local application)

CN 1998805015 A 19980513 (Division of application)

Priority: US 1997856428 A 19970514

Original IPC: H04B-1/707(I,CN,20060101,A,F) H04L-1/00(I,CN,20060101,A,L)

Current IPC: H04B-1/707(B,A,I,H,CN,20060101,20060201,A,F) H04B-

1/707(B,I,H,CN,20060101,20060201,C,L) H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-

7/005(R,I,M,EP,20060101,20051008,C) H04B-7/26(R,I,M,JP,20060101,20051220,A,L) H04B-

7/26(R,I,M,JP,20060101,20051220,C,L) H04J-13/02(R,I,M,JP,20060101,20051220,C,L) H04J-

13/02(R,I,M,JP,20060101,20051220,A,L) H04L-1/00(R,I,M,EP,20060101,20051008,C)

13/04(R,I,M,JP,20060101,20051220,A,L) H04L-1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

## Czech Republic

**Publication No.** CZ 298696 B6 (Update 200804 E)

Publication Date: 20071227

Language: CS

Application: WO 1998US9868 A 19980513 (PCT Application)

CZ 19993990 A 19980513 (Local application)

Priority: US 1997856428 A 19970514

Related Publication: CZ 9903990 A (Previously issued patent)

WO 1998052365 A (Based on OPI patent )

Original IPC: H04Q-7/00(I,CZ,20060101,A,F) H04Q-7/00(I,M,98,20060101,C)

Current IPC: H04Q-7/00(I,CZ,20060101,A,F) H04Q-7/00(I,M,98,20060101,C)

**Publication No.** CZ 199903990 A3 (Update 200037 E)

Publication Date: 20000614

Language: CS

Application: WO 1998US9868 A 19980513 (PCT Application)

CZ 19993990 A 19980513 (Local application)

Priority: US 1997856428 A 19970514

Related Publication: WO 1998052365 A (Based on OPI patent )

Original IPC: H04Q-7/00(A)

Current IPC: H04Q-7/00(R,I,M,EP,20060101,20051206,A) H04Q-7/00(R,I,M,EP,20060101,20051206,C)

## Germany

**Publication No.** DE 69838133 E (Update 200761 E)

Publication Date: 20070906

Assignee: QUALCOMM INC; US (QUAL-N)

Inventor: ODENWALDER J P

Language: DE

Application: DE 69838133 A 19980513 (Local application)

EP 1998922295 A 19980513 (Application)

WO 1998US9868 A 19980513 (PCT Application)

Priority: US 1997856428 A 19970514

Related Publication: EP 981914 A (Based on OPI patent )

WO 1998052365 A (Based on OPI patent )

Original IPC: H04Q-7/00(I,DE,20060101,A,F) H04Q-7/00(I,M,98,20060101,C)

Current IPC: H04Q-7/00(I,DE,20060101,A,F) H04Q-7/00(I,M,98,20060101,C)

**Publication No.** DE 69838133 T2 (Update 200774 E)

Publication Date: 20071031

Assignee: QUALCOMM INC; US (QUAL-N)

Inventor: ODENWALDER J P

Language: DE

Application: DE 69838133 A 19980513 (Local application)

EP 1998922295 A 19980513 (Application)

WO 1998US9868 A 19980513 (PCT Application)

Priority: US 1997856428 A 19970514

Related Publication: EP 981914 A (Based on OPI patent )

WO 1998052365 A (Based on OPI patent )

Original IPC: H04Q-7/00(B,I,H,EP,20060101,20051017,A,F) H04Q-7/00(B,I,M,98,20060101,20051017,C)

Current IPC: H03M-13/00(B,I,M,RU,20060101,20041210,C,F) H03M-

13/27(B,I,M,RU,20060101,20041210,A,F) H04B-1/707(R,I,M,EP,20060101,20051008,A) H04B-

1/707(R,I,M,EP,20060101,20051008,C) H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-

7/005(R,I,M,EP,20060101,20051008,C) H04B-7/26(R,I,M,JP,20060101,20051220,A,L) H04B-

7/26(R,I,M,JP,20060101,20051220,C,L) H04J-13/02(R,I,M,JP,20060101,20051220,C,L) H04J-

13/04(R,I,M,JP,20060101,20051220,A,L) H04L-1/00(R,I,M,EP,20060101,20051008,A) H04L-

1/00(R,I,M,EP,20060101,20051008,C) H04Q-7/00(B,I,H,EP,20060101,20051017,A,F) H04Q-

7/00(B,I,H,EP,20060101,20051017,C,F)

## EPO

**Publication No.** EP 1596519 A2 (Update 200575 E)

Publication Date: 20051116

**Eine Teilnehmereinheit und Verfahren zur Nutzung in einem drahtlosen Kommunikationssystem**

**A subscriber unit and method for use in a wireless communication system**

**Une unite d'abonne et procede d'utilisation dans und systeme de communication sans fil**

Assignee: Qualcomm, Incorporated, 5775 Morehouse Drive, San Diego, CA 92121-1714, US (QUAL-N)

Inventor: Odenwalder, Joseph P., 14967 Rancho Real, Del Mar, CA 92014, US

Agent: Walsh, Michael Joseph, TOMKINS & CO., 5, Dartmouth Road, Dublin 6, IE

Language: EN

Application: EP 1998922295 A 19980513 (Division of application)

EP 200518037 A 19980513 (Local application)

Priority: US 1997856428 A 19970514

Related Publication: EP 981914 A (Division of patent)

Designated States: (Regional Original) AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI

Original IPC: H04L-1/00(A)

Current IPC: H04L-1/00(R,A,N,M,EP,20060101,20060722,A) H04L-1/00(R,N,M,EP,20060101,20060722,C)

H04L-1/08(R,I,M,EP,20060101,20060722,A) H04L-1/08(R,I,M,EP,20060101,20060722,C)

Original Abstract: The invention relates to a method and a transmitter apparatus for a variable data rate signal. The invention provides an interleaver configured to interleave a frame of code symbols to produce a sequence of interleaved symbols having a first predetermined number of symbols. A repeater is configured to repeat the sequence of interleaved symbols a number of times and to repeat a subset of the sequence of interleaved symbols, wherein the subset has a second predetermined number of symbols, and wherein the second predetermined number of symbols is less than the first predetermined number of symbols.

Claim:

1. A method of transmitting a variable data rate signal comprising:

- interleaving a frame of code symbols to produce a sequence of interleaved symbols having a first predetermined number of symbols;
- repeating the sequence of interleaved symbols a number of times; and

- repeating a subset of the sequence of interleaved symbols, wherein the subset has a second predetermined number of symbols, and wherein the second predetermined number of symbols is less than the first predetermined number of symbols.

**Publication No.** EP 981914 A2 (Update 200016 E)

Publication Date: 20000301

Assignee: QUALCOMM INCORPORATED, 6455 Lusk Boulevard, San Diego, California 92121, US  
(QUAL-N)

Inventor: ODENWALDER, Joseph, P., 14967 Rancho Real, Del Mar, CA 92014, US

Agent: Walsh, Michael Joseph, TOMKINS & CO., 5, Dartmouth Road, Dublin 6, IE

Language: EN

Application: EP 1998922295 A 19980513 (Local application)

WO 1998US9868 A 19980513 (PCT Application)

Priority: US 1997856428 A 19970514

Related Publication: WO 1998052365 A (Based on OPI patent )

Designated States: (Regional Original) AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC  
MK NL PT RO SE SI

Original IPC: H04Q-7/00(A)

Current IPC: H04B-1/707(R,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C)  
H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-  
7/26(R,I,M,JP,20060101,20051220,A,L) H04B-7/26(R,I,M,JP,20060101,20051220,C,L) H04J-  
13/02(R,I,M,JP,20060101,20051220,C,L) H04J-13/04(R,I,M,JP,20060101,20051220,A,L) H04L-  
1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

Original Abstract: A set of individually gain adjusted subscriber channels (402, 404, 411, 415) are formed via the use of a set of orthogonal subchannel codes (Wc, Ws, Wf) having a small number of PN spreading chips per orthogonal waveform period. Data to be transmitted via one of the transmit channels is low code rate error correction encoded and sequence repeated before being modulated with one of the subchannel codes, gain adjusted, and summed with data modulated using the other subchannel codes. The resulting summed data (410, 420) is modulated using a user long code and a pseudorandom spreading code (PN code) and upconverted for transmission. The use of the short orthogonal codes provides interference suppression while still allowing extensive error correction coding and repetition for time diversity to overcome the Raleigh fading commonly experienced in terrestrial wireless systems. The set of sub-channel codes may comprise four Walsh codes, each orthogonal to the remaining codes of the set. The use of four sub-channels is preferred as it allows shorter orthogonal codes to be used, however, the use of a greater number of channels and therefore longer codes is acceptable. Preferably, pilot data is transmitted via a first one of the transmit channels and power control data transmitted via a second transmit channel. The length, or number of chips, in each channel code may be different to further reduce the peak-to-average transmit power for higher rate data transmission.

**Publication No.** EP 981914 B1 (Update 200751 E)

Publication Date: 20070725

**TEILNEHMERGERAT MIT MEHREREN STEUER- UND INFORMATIONSDATEN FUR CDMA  
DRAHTLOSES KOMMUNIKATIONSSYSTEM**

**SUBSCRIBER UNIT WITH PLURAL CONTROL AND DATA SOURCES FOR CDMA WIRELESS  
COMMUNICATION SYSTEM**

**UNITE D'ABONNE ET PROCEDE UTILE DANS UN SYSTEME DE TELECOMMUNICATIONS  
SANS FIL**

Assignee: QUALCOMM INCORPORATED, 5775 Morehouse Drive, San Diego, California 92121-1714, US  
(QUAL-N)

Inventor: ODENWALDER J

Agent: Walsh, Michael Joseph, TOMKINS & CO., 5, Dartmouth Road, Dublin 6, IE

Language: EN

Application: EP 1998922295 A 19980513 (Local application)

WO 1998US9868 A 19980513 (PCT Application)

EP 200518037 A 20050819 (Related to application)

Priority: US 1997856428 A 19970514

Related Publication: EP 1596519 A (Related to patent)

WO 1998052365 A (Based on OPI patent )

Designated States: (Regional Original) AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI

Original IPC: H04Q-7/00(B,I,H,EP,20060101,19990219,A,F) H04Q-7/00(B,I,M,98,20060101,19990219,C)

Current IPC: H03M-13/00(B,I,M,RU,20060101,20041210,C,F) H03M-

13/27(B,I,M,RU,20060101,20041210,A,F) H04B-1/707(R,I,M,EP,20060101,20051008,A) H04B-

1/707(R,I,M,EP,20060101,20051008,C) H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-

7/005(R,I,M,EP,20060101,20051008,C) H04B-7/26(R,I,M,JP,20060101,20051220,A,L) H04B-

7/26(R,I,M,JP,20060101,20051220,C,L) H04J-13/02(R,I,M,JP,20060101,20051220,C,L) H04J-

13/04(R,I,M,JP,20060101,20051220,A,L) H04L-1/00(R,I,M,EP,20060101,20051008,A) H04L-

1/00(R,I,M,EP,20060101,20051008,C) H04Q-7/00(B,I,H,EP,20060101,19990219,A,F) H04Q-

7/00(B,I,H,EP,20060101,19990219,C,F)

Claim:

1. Ein Verfahren zum Modulieren eines Signals durch Erzeugen von Daten zur Übertragung, und zwar geeignet zu Übertragung von einer Teilnehmereinheit zu einer Basisstation, in einem Kommunikationssystem bzw. Nachrichtenübermittlungssystem **gekennzeichnet dadurch, dass** das Verfahren die folgenden Schritte aufweist:

- Modulieren von kanalcodierten Daten von einer Vielzahl von Kanälen mit einem assoziierten Code für jeden Kanal, ausgewählt aus einer Anzahl von assoziierten Codes, wobei jeder assoziierte Code eine unterschiedliche Länge von verbleibenden assoziierten Codes besitzt und jeder assoziierte Code orthogonal zu verbleibenden assoziierten Codes ist, und zwar zum Erzeugen einer Vielzahl von Stromen mit modulierten Symbolen;
- Kombinieren der Vielzahl von Stromen mit modulierten Symbolen in zwei kombinierte Stroms; und
- komplexes Multiplizieren der zwei kombinierten Stroms mit einem komplexen Pseudo-Rausch-Code.

1. A method for modulating a signal by generating data for transmission suitable for transmission from a subscriber unit to a base station in a communication system **characterised in that** the method comprises the steps of:

- modulating channel encoded data from a plurality of channels with an associated code for each channel, selected from a number of associated codes, wherein each associated code is of a different length from remaining associated codes and each associated code is orthogonal to remaining associated codes, to produce a plurality of streams of modulated symbols;
- combining the plurality of streams of modulated symbols into two combined streams; and
- complex multiplying said two combined streams with a complex pseudonoise code.

1. Procéde de modulation d'un signal en produisant des données pour transmission adaptées à une transmission d'un poste d'abonné à une station de base dans un système de communication, **caractérisé en ce que** le procédé comprend les étapes suivantes:

- moduler des données codées de canal en provenance d'une pluralité de canaux par un code associé pour chaque canal, choisi parmi plusieurs codes associés, dans lequel chaque code associé a une longueur différente des autres codes associés et chaque code associé est orthogonal aux autres codes associés, pour produire une pluralité de flux de symboles modulés;
- combiner la pluralité de flux de symboles modulés en deux flux combinés; et
- effectuer une multiplication complexe des deux flux combinés par un code complexe de pseudobruit.

## Spain

### Publication No. ES 2286851 T3 (Update 200782 E)

Publication Date: 20071201

Assignee: QUALCOMM INC (QUAL-N)

Language: ES

Application: EP 1998922295 A 19980513 (Application)

Priority: US 1997856428 A 19970514

Related Publication: EP 981914 A (Based on OPI patent )

Original IPC: H04Q-7/00(I,ES,20060101,A,F) H04Q-7/00(I,M,98,20060101,C)

Current IPC: H03M-13/00(B,I,M,RU,20060101,20041210,C,F) H03M-

13/27(B,I,M,RU,20060101,20041210,A,F) H04B-1/707(R,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C) H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-7/26(R,I,M,JP,20060101,20051220,A,L) H04B-7/26(R,I,M,JP,20060101,20051220,C,L) H04J-13/02(R,I,M,JP,20060101,20051220,C,L) H04J-13/04(R,I,M,JP,20060101,20051220,A,L) H04L-1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C) H04Q-7/00(B,I,H,ES,20060101,20071201,A,F) H04Q-7/00(B,I,H,ES,20060101,20071201,C,F)

## Finland

### Publication No. FI 200500979 A (Update 200579 E)

Publication Date: 20050930

Language: FI

Application: EP 1998922295 A 19980513 (Division of application)

FI 2005979 A 20050930 (Local application)

Priority: US 1997856428 A 19970514

Original IPC: H04B(A)

Current IPC: H04B-1/707(R,A,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C) H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-7/26(R,I,M,JP,20060101,20051220,A,L) H04B-7/26(R,I,M,JP,20060101,20051220,C,L) H04J-13/02(R,I,M,JP,20060101,20051220,C,L) H04J-13/04(R,I,M,JP,20060101,20051220,A,L) H04L-1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

### Publication No. FI 199902248 A (Update 200017 E)

Publication Date: 20000114

Assignee: QUALCOMM INC (QUAL-N)

Inventor: ODENWALDER J P

Language: FI

Application: WO 1998US9868 A 19980513 (PCT Application)

FI 19992248 A 19991018 (Local application)

Priority: US 1997856428 A 19970514

Original IPC: H04Q(A)

Current IPC: H04B-1/707(R,A,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C)

H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-

7/26(R,I,M,JP,20060101,20051220,A,L) H04B-7/26(R,I,M,JP,20060101,20051220,C,L) H04J-

13/02(R,I,M,JP,20060101,20051220,C,L) H04J-13/04(R,I,M,JP,20060101,20051220,A,L) H04L-

1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

## Israel

**Publication No.** IL 132456 A (Update 200429 E)

Publication Date: 20040328

Assignee: QUALCOMM INC (QUAL-N)

Language: EN

Application: IL 132456 A 19980513 (Local application)

Priority: US 1997856428 A 19970514

Related Publication: WO 1998052365 A (Based on OPI patent )

Original IPC: H04B-1/707(A) H04B-7/211(B) H04B-7/216(B)

Current IPC: H04B-1/707(R,A,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C)

H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-

7/26(R,I,M,JP,20060101,20051220,A,L) H04B-7/26(R,I,M,JP,20060101,20051220,C,L) H04J-

13/02(R,I,M,JP,20060101,20051220,C,L) H04J-13/04(R,I,M,JP,20060101,20051220,A,L) H04L-

1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

## Japan

**Publication No.** JP 2002508896 W (Update 200222 E)

Publication Date: 20020319

Language: JA (53 pages)

Application: JP 1998549548 A 19980513 (Local application)

WO 1998US9868 A 19980513 (PCT Application)

Priority: US 1997856428 A 19970514

Related Publication: WO 1998052365 A (Based on OPI patent )

Original IPC: H04B-7/26(A) H04J-13/04(B) H04L-1/00(B)

Current IPC: H04B-7/26(A) H04J-13/04(B) H04L-1/00(B)

## Korea

**Publication No.** KR 2001012602 A (Update 200154 E)

Publication Date: 20010215

Assignee: QUALCOMM INC (QUAL-N)

Language: KO

Application: KR 1999710561 A 19991115 (Local application)

Priority: US 1997856428 A 19970514

Original IPC: H04Q-7/00(A)  
Current IPC: H04Q-7/00(A)

**Publication No.** KR 455822 B (Update 200517 E)

Publication Date: 20041106

Assignee: QUALCOMM INC (QUAL-N)

Language: KO

Application: WO 1998US9868 A 19980513 (PCT Application)  
KR 1999710561 A 19991115 (Local application)

Priority: US 1997856428 A 19970514

Related Publication: KR 2001012602 A (Previously issued patent)

WO 1998052365 A (Based on OPI patent )

Original IPC: H04Q-7/00(A) H04Q-7/00(A)

Current IPC: H04Q-7/00(A) H04Q-7/00(A)

## Mexico

**Publication No.** MX 239698 B (Update 200702 E)

Publication Date: 20060823

Language: ES

Application: WO 1998US9868 A 19980513 (PCT Application)  
MX 199910403 A 19991112 (Local application)

Priority: US 1997856428 A 19970514

Related Publication: WO 1998052365 A (Based on OPI patent )

Original IPC: H04Q-7/00(A) H04Q-7/00(B)

Current IPC: H04Q-7/00(A) H04Q-7/00(B)

**Publication No.** MX 199910403 A1 (Update 200133 E)

Publication Date: 20000601

Language: ES

Application: MX 199910403 A 19991112 (Local application)

Priority: US 1997856428 A 19970514

WO 1998US9868 A 19980513

Original IPC: H04Q-7/00(A)

Current IPC: H04Q-7/00(A)

## Norway

**Publication No.** NO 200700315 A (Update 200724 NCE)

Publication Date: 19991112

Language: NO

Application: NO 19995530 A 19991112 (Division of application)  
NO 2007315 A 20070117 (Local application)

Priority: NO 2007315 A 20070117 (Local application)

Original IPC: H04B-1/707(I,NO,20060101,A,F) H04B-1/707(I,M,98,20060101,C)

Current IPC: H04B-1/707(I,NO,20060101,A,F) H04B-1/707(I,M,98,20060101,C)

**Publication No.** NO 324198 B1 (Update 200763 E)

Publication Date: 20070910

Assignee: QUALCOMM INC; US (QUAL-N)

Inventor: ODENWALDER J P

Language: NO

Application: WO 1998US9868 A 19980513 (PCT Application)

NO 19995530 A 19991112 (Local application)

Priority: US 1997856428 A 19970514

Related Publication: NO 9905530 A (Previously issued patent)

Original IPC: H04B-1/707(I,NO,20060101,A,F) H04B-1/707(I,M,98,20060101,C) H04B-7/005(I,NO,20060101,A,L) H04B-7/005(I,M,98,20060101,C) H04B-7/26(I,NO,20060101,A,L) H04B-7/26(I,M,98,20060101,C) H04J-13/02(I,M,98,20060101,C) H04J-13/04(I,NO,20060101,A,L) H04L-1/00(I,NO,20060101,A,L) H04L-1/00(I,M,98,20060101,C)

Current IPC: H03M-13/00(B,I,M,RU,20060101,20041210,C,F) H03M-13/27(B,I,M,RU,20060101,20041210,A,F) H04B-1/707(R,I,M,NO,20060101,20051008,A,F) H04B-1/707(R,I,M,NO,20060101,20051008,C,F) H04B-7/005(R,I,M,NO,20060101,20051008,C,L) H04B-7/26(R,I,M,NO,20060101,20051220,A,L) H04B-7/26(R,I,M,NO,20060101,20051220,C,L) H04J-13/02(R,I,M,NO,20060101,20051220,A,L) H04J-13/04(R,I,M,NO,20060101,20051220,A,L) H04L-1/00(R,I,M,NO,20060101,20051008,A,L) H04L-1/00(R,I,M,NO,20060101,20051008,C,L)

**Publication No.** NO 199905530 A (Update 200009 E)

Publication Date: 19991112

Assignee: QUALCOMM INC (QUAL-N)

Inventor: ODENWALDER J P

Language: NO

Application: WO 1998US9868 A 19980513 (PCT Application)

NO 19995530 A 19991112 (Local application)

Priority: US 1997856428 A 19970514

Original IPC: H04B(A)

Current IPC: H04B-1/707(R,A,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C) H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-7/26(R,I,M,JP,20060101,20051220,A,L) H04B-7/26(R,I,M,JP,20060101,20051220,C,L) H04J-13/02(R,I,M,JP,20060101,20051220,C,L) H04J-13/04(R,I,M,JP,20060101,20051220,A,L) H04L-1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

## New Zealand

**Publication No.** NZ 500443 A (Update 200115 E)

Publication Date: 20010223

Assignee: QUALCOMM INC (QUAL-N)

Inventor: ODENWALDER J P

Language: EN

Application: NZ 500443 A 19980513 (Local application)

WO 1998US9869 A 19980513 (PCT Application)

Priority: US 1997856428 A 19970514

Related Publication: WO 1998052365 A (Based on OPI patent )

Original IPC: H04Q-7/00(A) H04B-1/707(B) H04L-1/00(B)

Current IPC: H04B-1/707(R,A,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C)  
H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04L-  
1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

## Russia

**Publication No.** RU 2242086 C2 (Update 200508 E)

Publication Date: 20041210

Assignee: QUALCOMM INC; US (QUAL-N)

Language: RU

Application: WO 1998US9868 A 19980513 (PCT Application)

RU 1999126418 A 19980513 (Local application)

Priority: US 1997856428 A 19970514

Related Publication: WO 1998052365 A (Based on OPI patent )

Original IPC: H03M-13/27(A) H04L-1/00(B)

Current IPC: H04B-1/707(R,A,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C)

H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-

7/26(R,I,M,JP,20060101,20051220,A,L) H04B-7/26(R,I,M,JP,20060101,20051220,C,L) H04J-

13/02(R,I,M,JP,20060101,20051220,C,L) H04J-13/04(R,I,M,JP,20060101,20051220,A,L) H04L-

1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

**Publication No.** RU 2313176 C2 (Update 200802 E)

Publication Date: 20071220

Assignee: QUALCOMM INC; US (QUAL-N)

Language: RU

Application: RU 1999641813 A 19980513 (Division of application)

RU 2001123498 A 19980513 (Local application)

Priority: US 1997856428 A 19970514

Original IPC: H03M-13/00(B,I,M,98,20060101,20070413,C) H03M-

13/27(B,I,H,RU,20060101,20070413,A,F) H04L-1/00(B,I,H,RU,20060101,20070413,A,L) H04L-  
1/00(B,I,M,98,20060101,20070413,C)

Current IPC: H03M-13/00(B,I,M,98,20060101,20070413,C) H03M-

13/27(B,I,H,RU,20060101,20070413,A,F) H04L-1/00(B,I,H,RU,20060101,20070413,A,L) H04L-  
1/00(B,I,M,98,20060101,20070413,C)

## United States

**Publication No.** US 20010007572 A1 (Update 200143 E)

Publication Date: 20010712

**High data CDMA wireless communication system using variable sized channel codes**

Assignee: Odenwalder, Joseph P., Del Mar, CA, US (ODEN-I)

Inventor: Odenwalder, Joseph P., Del Mar, CA, US

Agent: QUALCOMM Incorporated, 5775 Morehouse Drive, San Diego, CA, US

Language: EN

Application: US 1996660438 A 19960607 (C-I-P of application)

US 1997856428 A 19970514 (Division of application)

US 2001785925 A 20010215 (Local application)

Related Publication: US 5926500 A (C-I-P of patent)  
Original IPC: H04B-1/707(A) H04B-15/00(B) H04K-1/00(B)

Current IPC: H04B-1/707(R,A,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C)  
H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-  
7/26(R,I,M,EP,20060101,20051008,A) H04B-7/26(R,I,M,EP,20060101,20051008,C) H04L-  
1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

Original US Class (secondary): 375149 375148

Original Abstract: A method and apparatus for high rate CDMA wireless communication is described. A set of individually gain adjusted subscriber channels are formed via the use of a set of orthogonal subchannel codes having a small number of PN spreading chips per orthogonal waveform period. Data to be transmitted via one of the transmit channels is low code rate error correction encoded and sequence repeated before being modulated with one of the subchannel codes, gain adjusted, and summed with data modulated using the other subchannel codes. The resulting summed data is modulated using a user long code and a pseudorandom spreading code (PN code) and upconverted for transmission. The use of the short orthogonal codes provides interference suppression while still allowing extensive error correction coding and repetition for time diversity to overcome the Raleigh fading commonly experienced in terrestrial wireless systems.

Claim: What is claimed is:

**1. 1.** An method for demodulating a signal comprising:

- multiplying an in-phase sample stream by a first short Walsh cover having a duration of fewer than sixty-four chips per orthogonal waveform period to produce an in-phase short Walsh despread symbol first channel stream;
- multiplying a quadrature-phase sample stream by the first short Walsh cover to produce a quadrature-phase short Walsh despread symbol first channel stream; and
- adding the in-phase short Walsh despread symbol first channel stream to the quadrature-phase short Walsh despread symbol first channel stream to produce a soft decision first channel data stream.

**Publication No.** US 20010055329 A1 (Update 200206 E)

Publication Date: 20011227

**High data rate CDMA wireless communication system using variable sized channel codes**

Assignee: Odenwalder, Joseph P., Del Mar, CA, US (ODEN-I)

Inventor: Odenwalder, Joseph P., Del Mar, CA, US

Agent: QUALCOMM Incorporated, 5775 Morehouse Drive, San Diego, CA, US

Language: EN

Application: US 1996660438 A 19960607 (C-I-P of application)

US 1997856428 A 19970514 (Division of application)

US 2001804652 A 20010312 (Local application)

Related Publication: US 5926500 A (C-I-P of patent)

Original IPC: H04B-1/69(A)

Current IPC: H04B-1/707(R,A,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C)  
H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-  
7/26(R,I,M,EP,20060101,20051008,A) H04B-7/26(R,I,M,EP,20060101,20051008,C) H04L-  
1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

Original US Class (secondary): 375279 375130

Original Abstract: A method and apparatus for high rate CDMA wireless communication is described. A set of individually gain adjusted subscriber channels are formed via the use of a set of orthogonal subchannel codes having a small number of PN spreading chips per orthogonal waveform period. Data to be transmitted via one of the transmit channels is low code rate error correction encoded and sequence repeated before being

modulated with one of the subchannel codes, gain adjusted, and summed with data modulated using the other subchannel codes. The resulting summed data is modulated using a user long code and a pseudorandom spreading code (PN code) and upconverted for transmission. The use of the short orthogonal codes provides interference suppression while still allowing extensive error correction coding and repetition for time diversity to overcome the Raleigh fading commonly experienced in terrestrial wireless systems.

Claim: WHAT IS CLAIMED IS:

**1. 1. A method of transmitting a variable data rate signal comprising:**

- interleaving a frame of code symbols to produce a sequence of interleaved symbols having a first predetermined number of symbols;
- repeating the sequence of interleaved symbols at least once; and
- repeating a subset of the sequence of interleaved symbols, wherein the subset has a second predetermined number of symbols, and wherein the second predetermined number of symbols is less than the first predetermined number of symbols.

**Publication No.** US 20040190600 A1 (Update 200465 E)

Publication Date: 20040930

**High data rate CDMA wireless communication system using variable sized channel codes**

Assignee: Odenwalder, Joseph P., Del Mar, CA, US (ODEN-I)

Inventor: Odenwalder, Joseph P., Del Mar, CA, US

Agent: Qualcomm Incorporated, Patents Department, 5775 Morehouse Drive, San Diego, CA, US

Language: EN

Application: US 1996654443 A 19960528 (C-I-P of application)

US 1996660438 A 19960607 (C-I-P of application)

US 1997856428 A 19970514 (Division of application)

US 2001785925 A 20010215 (Continuation of application)

US 2004756868 A 20040113 (Local application)

Related Publication: US 5926500 A (C-I-P of patent)

US 5930230 A (C-I-P of patent)

US 6678311 A (Continuation of patent)

Original IPC: H04B-1/69(A)

Current IPC: H04B-1/707(R,A,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C)

H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-

7/26(R,I,M,EP,20060101,20051008,A) H04B-7/26(R,I,M,EP,20060101,20051008,C) H04L-

1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

Original US Class (secondary): 375147

Original Abstract: Method and apparatus for high rate code-division multiple access wireless communication is described. Each of a channel encoded data is modulated by an associated code having a small number of pseudo-noise spreading chips per orthogonal waveform period, thus producing a set of streams of modulated symbols. Each of the set of streams of modulated symbols is then gain adjusted, and combined to yield two streams of combined symbols. The combination is the set of streams is carried out to reduce a peak-to-average ratio of the transmission. The resulting two combined symbol streams are modulated by a complex multiplier using a user long code and a pseudorandom spreading code (PN code) and upconverted for transmission.

Claim: I (We) claim:

**1. 1. A method for generating data for transmission from a subscriber unit to a base station, the method comprising:**

- modulating each of a plurality of channel encoded data with an associated code to produce a plurality of streams of modulated symbols;

- combining the plurality of streams of modulated symbols into two combined streams to reduce a peak-to-average ratio of the transmission; and
- complex multiplying said two combined streams with a complex pseudonoise code.

**Publication No.** US 6621875 B2 (Update 200362 E)

Publication Date: 20030916

**High data rate CDMA wireless communication system using variable sized channel codes**

Assignee: Qualcomm Incorporated, San Diego, CA, US (QUAL-N)

Inventor: Odenwalder, Joseph P., Del Mar, CA, US

Agent: Wadsworth, Philip R., US

Baker, Kent D., US

Yafuso, Byron, US

Language: EN

Application: US 1996654443 A 19960528 (C-I-P of application)

US 1996660438 A 19960607 (C-I-P of application)

US 1997856428 A 19970514 (Division of application)

US 2001804652 A 20010312 (Local application)

Related Publication: US 5926500 A (C-I-P of patent)

US 5930230 A (C-I-P of patent)

Original IPC: H04L-25/49(A)

Current IPC: H04B-1/707(R,A,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C)

H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-

7/26(R,I,M,EP,20060101,20051008,A) H04B-7/26(R,I,M,EP,20060101,20051008,C) H04L-

1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

Original US Class (secondary): 375146 370208 375295

Original Abstract: A method and apparatus for high rate CDMA wireless communication is described.

Variable data rates are generated using a set of different encoder, interleaver, and symbol repetition configurations. An encoder associated with each rate generates a variable number of symbols during each frame period. This variable number of symbols is repeated as necessary to form a constant number of symbols equal to a fixed number of symbols that can be then repeated a fixed number of repetitions before transmission. Where the constant number of symbols is not an integer multiple of the variable number of symbols for a particular rate, a subset of the variable number of symbols is repeated to fill in the remaining symbols necessary to equal the constant number of symbols.

Claim: What is claimed is:

1. 12. A transmitter apparatus comprising:

- an interleaver configured to interleave a frame of code symbols to produce a sequence of interleaved symbols having a first predetermined number of symbols; and
- a repeater configured to repeat the sequence of interleaved symbols a number of times and to repeat a subset of the sequence of interleaved symbols, wherein the subset has a second predetermined number of symbols, and wherein the second predetermined number of symbols is less than the first predetermined number of symbols.

**Publication No.** US 6678311 B2 (Update 200405 E)

Publication Date: 20040113

**High data CDMA wireless communication system using variable sized channel codes**

Assignee: Qualcomm Incorporated, San Diego, CA, US (QUAL-N)

Inventor: Odenwalder, Joseph P., Del Mar, CA, US

Agent: Wadsworth, Philip, US

Baker, Kent, US

Yafuso, Byron, US

Language: EN

Application: US 1996654443 A 19960528 (C-I-P of application)

US 1996660438 A 19960607 (C-I-P of application)

US 1997856428 A 19970514 (Division of application)

US 2001785925 A 20010215 (Local application)

Related Publication: US 5926500 A (C-I-P of patent)

US 5930230 A (C-I-P of patent)

Original IPC: H04B-1/707(A)

Current IPC: H04B-1/707(R,A,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C)

H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-

7/26(R,I,M,EP,20060101,20051008,A) H04B-7/26(R,I,M,EP,20060101,20051008,C) H04L-

1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

Original US Class (secondary): 370342 375147

Original Abstract: A method and apparatus for demodulation in high rate CDMA wireless communication is described. In a described high rate CDMA wireless system, a transmitter forms a set of individually gain adjusted subscriber channels using a set of orthogonal subchannel codes having a small number of PN spreading chips per orthogonal waveform period. An illustrative high rate CDMA wireless system uses Walsh codes, each having a duration of fewer than sixty-four chips per orthogonal waveform period. A receiver demodulates each of the subscriber channels using the same orthogonal subchannel codes.

Claim: What is claimed is:

1. 25. A receiver apparatus comprising:

- means for complex-multiplying a complex received signal by an in-phase pseudorandom spreading code and a quadrature-phase pseudorandom spreading code to provide an in-phase sample stream and a quadrature-phase sample stream;
- means for filtering the in-phase sample stream to provide an in-phase pilot filter signal;
- means for filtering the quadrature-phase sample stream to provide a quadrature-phase pilot filter signal;
- means for multiplying the in-phase sample stream by a first short Walsh cover having a duration of fewer than sixty-four chips per orthogonal waveform period to produce an in-phase short Walsh despread symbol first channel stream;
- means for multiplying the quadrature-phase sample stream by the first short Walsh cover to produce a quadrature-phase short Walsh despread symbol first channel stream; and
- means for phase rotating and scaling the quadrature-phase short Walsh despread symbol first channel stream and the in-phase short Walsh despread symbol first channel stream based on the in-phase pilot filter signal and the quadrature-phase pilot filter signal to produce a soft decision first channel data stream.

## WIPO

**Publication No.** WO 1998052365 A2 (Update 199901 B)

Publication Date: 19981119

**A SUBSCRIBER UNIT AND METHOD FOR USE IN A WIRELESS COMMUNICATION SYSTEM**

Assignee: QUALCOMM INCORPORATED, 6455 LUSK BOULEVARD, SAN DIEGO, CA 92121, US

(QUAL-N)

Inventor: ODENWALDER, JOSEPH, P., 14967 RANCHO REAL, DEL MAR, CA 92014, US

Language: EN (46 pages, 14 drawings)

Application: WO 1998US9868 A 19980513 (Local application)

Priority: US 1997856428 A 19970514

Designated States: (National Original) AL AM AT AU AZ BA BB BG BR BY CA CH CN CU CZ DE DK EE ES FI GB GE GH GM GW HU ID IL IS JP KE KG KP KR KZ LC LK LR LS LT LU LV MD MG MK MN MW MX NO NZ PL PT RO RU SD SE SG SI SK SL TJ TM TR TT UA UG UZ VN YU ZW

(Regional Original) AT BE CH CY DE DK EA ES FI FR GB GH GM GR IE IT KE LS LU MC MW NL OA PT SD SE SZ UG ZW

Original IPC: H04Q-7/00(A)

Current IPC: H04B-1/707(R,A,I,M,EP,20060101,20051008,A) H04B-1/707(R,I,M,EP,20060101,20051008,C) H04B-7/005(R,I,M,EP,20060101,20051008,A) H04B-7/005(R,I,M,EP,20060101,20051008,C) H04B-7/26(R,I,M,JP,20060101,20051220,A,L) H04B-7/26(R,I,M,JP,20060101,20051220,C,L) H04J-13/02(R,I,M,JP,20060101,20051220,C,L) H04J-13/04(R,I,M,JP,20060101,20051220,A,L) H04L-1/00(R,I,M,EP,20060101,20051008,A) H04L-1/00(R,I,M,EP,20060101,20051008,C)

Original Abstract: A set of individually gain adjusted subscriber channels (402, 404, 411, 415) are formed via the use of a set of orthogonal subchannel codes (Wc, Ws, Wf) having a small number of PN spreading chips per orthogonal waveform period. Data to be transmitted via one of the transmit channels is low code rate error correction encoded and sequence repeated before being modulated with one of the subchannel codes, gain adjusted, and summed with data modulated using the other subchannel codes. The resulting summed data (410, 420) is modulated using a user long code and a pseudorandom spreading code (PN code) and upconverted for transmission. The use of the short orthogonal codes provides interference suppression while still allowing extensive error correction coding and repetition for time diversity to overcome the Raleigh fading commonly experienced in terrestrial wireless systems. The set of sub-channel codes may comprise four Walsh codes, each orthogonal to the remaining codes of the set. The use of four sub-channels is preferred as it allows shorter orthogonal codes to be used, however, the use of a greater number of channels and therefore longer codes is acceptable. Preferably, pilot data is transmitted via a first one of the transmit channels and power control data transmitted via a second transmit channel. The length, or number of chips, in each channel code may be different to further reduce the peak-to-average transmit power for higher rate data transmission.